

REMARKS

Claim Rejections

Claims 17-27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Marcinkiewicz et al. (U.S. Patent No. 5,422,513) in view of Juskey et al. (U.S. Patent No. 5,371,404). It is noted that the references Marcinkiewicz and Juskey et al. were initially cited by the Examiner in the outstanding Final Office Action. Thus, this amendment represents Applicant's initial opportunity to respond to the rejections based upon these references.

Drawings

It is noted that no Patent Drawing Review (Form PTO-948) was received with the outstanding Office Action. Thus, Applicant must assume that the drawings are acceptable as filed.

Claims

The primary reference to Marcinkiewicz et al. discloses an integrated circuit chip having a substrate (10), a first chip (24), dielectric layers (18) with vias (19) and interconnects (20) formed within the dielectric layers and interconnection pad (22).

On page 3 of the outstanding Office Action, the Examiner admits that:

The teaching of Marcinkiewicz et al. as discussed above does not disclose the carrier made of metal or aluminum (re claims 17, 25), a plurality of pads formed a grid array (re claims 21, 23), a plurality of connectors such as solder bumps (re claim 22), the dielectric material made of polyimide, epoxy (re claim 24), the conductive column made of aluminum, aluminum alloy, copper, copper alloy (re claim 26).

The cited reference to Juskey et al. discloses a thermally conductive integrated circuit package including a molding compound (20), a semiconductor device (16), an underfill adhesive (25), a substrate (10), a least one conductive via (26) through the substrate.

On page 3 of the outstanding Office Action, the Examiner states that:

Re claim 17, 25, Juskey et al disclose a carrier (20) made of metal such as aluminum (col 4, lines 13-15).

Applicant respectfully traverses this interpretation of Juskey. Juskey et al. specifically state, at col. 4, lines 5-17:

The molding compound 20 also encapsulates the underfill material 25 and covers portions or substantially all of the upper surface 15 of the substrate 10. Molding compound 20 comprises a thermally and electrically conductive material, such as an epoxy, having at least one filler, for example, a metallic element or alloy, which substantially contributes to the thermal and electrical conductive properties of the molding compound. The molding compound 20 is typically filled to approximately 70% to 75% with copper, aluminum, nickel, gold, silver, or similar type materials to provide electrical and thermal conductivity.

Thus, it is clear that the molding compound of Juskey et al. comprises a conductive plastic compound (heat sink) including metal particles, but does not comprise a metal carrier with a cavity as in Applicant's invention. The molding compound of Juskey et al. (20) is molded and covers the upper surface (15) of the substrate (10). It is abundantly clear that the molding compound (20) is not a carrier for supporting the IC (16) and build-up forming dielectric layers. In addition, the molding compound (20) does not have a top surface coplanar with the active surface of the IC (16) for formation of dielectric layers.

Juskey et al. discloses a metal and plastic molding compound, whereas the present invention discloses a metal carrier. Further, Juskey et al. discloses a single substrate, but does not teach a plurality of dielectric layers formed on the active surface of the die on the top surface of the metal carrier. Additionally, Juskey et al. teaches an underfill adhesive to fill the gap between the semiconductor device and the substrate, but does not teach the die being positioned within the cavity such that the active surface of the die is in coplanar with the top surface of the metal carrier. Further, Juskey et al. teaches at least one conductive via (26) through the substrate, but does not teach each plurality of dielectric layers having a plurality of conductive columns electrically connected to the bonding pads of the die and a plurality of conductive traces electrically connecting corresponding conductive columns of one plurality of dielectric layers to a corresponding conductive columns of another plurality of dielectric layers.

It is a basic principle of U.S. patent law that it is improper to arbitrarily pick and choose prior art patents and combine selected portions of the selected patents on the basis of Applicant's disclosure to create a hypothetical combination which allegedly renders a claim obvious, unless there is some direction in the selected prior art patents to combine the selected teachings in a manner so as to negate the patentability of the claimed subject matter. This principle was enunciated over 40 years ago by the Court of Customs and Patent Appeals in In re Rothermel and Waddell, 125 USPQ 328 (CCPA 1960) wherein the court stated, at page 331:

The examiner and the board in rejecting the appealed claims did so by what appears to us to be a piecemeal reconstruction of the prior art patents in the light of appellants' disclosure. ... It is easy now to attribute to this prior art the knowledge which was first made available by appellants and then to assume that it would have been obvious to one having the ordinary skill in the art to make these suggested reconstructions. While such a reconstruction of the art may be an alluring way to rationalize a rejection of the claims, it is not the type of rejection which the statute authorizes.

The same conclusion was later reached by the Court of Appeals for the Federal Circuit in Orthopedic Equipment Company Inc. v. United States, 217 USPQ 193 (Fed.Cir. 1983). In that decision, the court stated, at page 199:

As has been previously explained, the available art shows each of the elements of the claims in suit. Armed with this information, would it then be non-obvious to this person of ordinary skill in the art to coordinate these elements in the same manner as the claims in suit? The difficulty which attaches to all honest attempts to answer this question can be attributed to the strong temptation to rely on hindsight while undertaking this evaluation. It is wrong to use the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit. Monday morning quarterbacking is quite improper when resolving the question of non-obviousness in a court of law.

In In re Geiger, 2 USPQ2d, 1276 (Fed.Cir. 1987) the court stated, at page 1278:

We agree with appellant that the PTO has failed to establish a *prima facie* case of obviousness. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting the combination.

In this particular case, Applicant submits that neither Marcinkiewicz et al., nor Juskey et al. contain the slightest suggestion that their respective teachings could be combined as postulated by the Examiner. Absent such a specific teaching in the prior art, there is simply no basis for a rejection under 35 U.S.C. § 103.

Even if the teachings of Marcinkiewicz et al. and Juskey et al. were combined, as suggested by the Examiner, the resultant combination does not suggest a metal carrier having a cavity in a top surface, the die being positioned within the cavity such that the passive surface and the side are within the cavity.

Summary

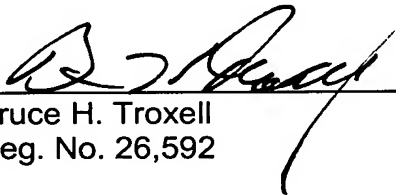
In view of the foregoing, Applicant submits that this application is now in condition for allowance and such action is respectfully requested. Should the Examiner not be of the opinion that this case is in condition for allowance, it is requested that this amendment be entered for the purposes of appeal, since this amendment represents Applicant's initial opportunity to respond to the rejections based upon Marcinkiewicz et al. and Juskey et al., which were initially cited in the outstanding Final Office Action.

Should any points remain in issue, which the Examiner feels could best be resolved by either a personal or a telephone interview, it is urged that Applicant's local attorney be contacted at the exchange listed below.

Respectfully submitted,

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